IT IS CLAIMED:

1. A method of sensing the data content of a non-volatile memory, comprising:

biasing a storage element of the non-volatile memory according to a set of operating parameters and target criteria;

determining the value of a parameter indicative of the state of said storage element a plurality of times with the storage element biased according to said set of operating parameters and target criteria; and

determining the data content of said storage element by forming a composite of said plurality of values of said parameter.

2. The method of claim 1, wherein said storage element is a multi-state storage element.

3. The method of claim 2, wherein said determining the value of a parameter is performed to yield a digital value.

4. The method of claim 2, wherein the storage element is a charge storing device.

5. The method of claim 4, wherein the parameter is a current.

6. The method of claim 4, wherein the parameter is a voltage.

7. The method of claim 4, wherein the parameter is a time.

8. The method of claim 4, wherein the parameter is a frequency.

9. The method of claim 4, wherein the parameter is a magnetic property.

10. The method of claim 4, wherein the parameter is an optical property.

11. The method of claim 2, wherein the forming a composite comprises:

adding the plurality of parameter values to form a sum; and

dividing the sum by the number of parameter values added.

12. The method of claim 11, wherein the plurality of parameter values are individually stored prior to adding the plurality of parameter values.

13. The method of claim 2, wherein the non-volatile memory comprises a memory unit containing a plurality of storage elements including said storage element and a controller, and wherein the composite is formed by the controller.

14. The method of claim 13, wherein the values of the parameter indicative of the state of the storage element are individually stored on the controller prior to the forming a composite.

15. The method of claim 13, wherein the values of the parameter indicative of the state of the storage element are individually stored on the memory unit prior to the forming a composite.

16. The method of claim 2, wherein the non-volatile memory comprises a memory unit containing a plurality of storage elements including said storage element and a controller, and wherein the values of the parameter indicative of the state of said storage element are individually stored on the memory unit prior to the forming a composite and wherein the composite is formed by the memory unit.

17. The method of claim 2, wherein said method of sensing the data content of a non-volatile memory is performed as part of the verify phase of a programming operation.

18. The method of claim 2, wherein the forming a composite comprises forming a mean of the plurality of parameter values.

19. The method of claim 2, wherein the forming a composite comprises forming a weighted mean of the plurality of parameter values.

20. The method of claim 2, wherein the forming a composite comprises a peak detection scheme.

21. The method of claim 2, wherein the forming a composite comprises omitting outlying values of the plurality of parameter values.

22. The method of claim 2, wherein the determining the value of a parameter indicative of the state of the storage element comprises:

determining a base value for the parameter; and

determining variation from the base value a plurality of times.

23. The method of claim 1, wherein said storage element is one of a plurality of storage elements read concurrently.

24. A method of writing a data value in a non-volatile memory, comprising:

altering the state of a storage element in the non-volatile memory;

comparing a plurality of times a parameter indicative of the resultant state of the storage element to a reference value indicative of the data value; and

determining whether to further alter the state of the storage element in response to said comparing a plurality of times.

25. The method of claim 24, wherein said storage element is a multi-state storage element.

26. The method of claim 25, wherein said comparing is performed using a digital numerical technique.

27. The method of claim 25, wherein the storage element is a charge storing device.

28. The method of claim 27, wherein the parameter is a current.

29. The method of claim 27, wherein the parameter is a voltage.

30. The method of claim 27, wherein the parameter is a time.

31. The method of claim 27, wherein the parameter is a frequency.

32. The method of claim 27, wherein the parameter is a magnetic property.

33. The method of claim 27, wherein the parameter is an optical property.

34. The method of claim 25, wherein said comparing comprises a peak detection method.

35. The method of claim 25, wherein said comparing comprises an analog filtered average detection.

36. The method of claim 25, wherein the non-volatile memory comprises a memory unit containing a plurality of storage elements including said storage element and a controller, and wherein the comparing is performed by the controller.

37. The method of claim 25, wherein the non-volatile memory comprises a memory unit containing a plurality of storage elements including said storage element and a controller, and wherein the comparing is performed by the memory unit.

38. The method of claim 24, wherein said storage element is one of a plurality of storage elements in which data are written concurrently.

39. A method of sensing the data content of a non-volatile storage element, comprising:

sensing the storage element in a first mode, wherein the storage element is sensed once for each of one or more first sets of bias conditions;

subsequently sensing the storage element in a second mode, wherein the storage element is sensed a plurality of times for each of one or more second sets of bias conditions; and

determining the data content of the storage element from a combination of the sensing in the first mode and the sensing in the second mode.

40. The method claim 39, wherein said storage element is a multi-state storage element.

41. The method claim 40, wherein the first mode is a coarse mode to determine an approximate data value and the second mode is a fine mode to refine the approximate data value.

42. The method claim 40, wherein the first mode determines a first data value and the second mode senses variations about the first data value.

43. The method claim 42, wherein the first mode is a binary search.

44. The method claim 43, wherein the second mode is a binary search and the second sets of bias conditions are a subset of the first sets of bias conditions.

45. The method claim 44, wherein the algorithm of the binary search of the second mode is determined based upon the first data value.

46. The method claim 40, wherein method of sensing the data content of a non-volatile memory cell is performed as part of the verify phase of a programming operation.

47. The method claim 46, wherein the first mode is applied during a coarse programming phase and the second mode is applied during a fine programming phase.

48. The method claim 46, wherein the second mode is a peak detection method.

49 A non-volatile memory comprising:

an array of storage elements;

read circuitry coupled to the array to provide a parameter associated with the state of a cell contained therein;

a sense amplifier coupled to the read circuitry to determine the value of the parameter; and

averaging circuitry coupled to the sense amplifier for forming a composite value for the single cell formed from multiple independently determined values of the parameter supplied from the sense amplifier.

50. The memory of claim 49, wherein the parameter is a current level.

51. The memory of claim 49, wherein the parameter is a voltage level.

52. The memory of claim 49, wherein the parameter is a time.

53. The memory of claim 49, wherein the parameter is a frequency.

54. The memory of claim 49, wherein the parameter is a magnetic property.

55. The memory of claim 49, wherein the parameter is an optical property.

56. The memory of claim 49, wherein the averaging circuitry comprises an adder to produce a sum of the multiple independently determined values and a division circuit for dividing the sum by the number of independently determined values added to produce the sum.

57. The memory of claim 49, wherein the memory comprises a storage section that includes the array, read circuitry, and sense amplifier and a controller section that includes the averaging circuitry.

58. The memory of claim 57, wherein the controller section further includes a plurality of registers wherein the multiple independently determined values of the parameter supplied from the sense amplifier are stored prior to being supplied to the averaging circuitry.

59. The memory of claim 57, wherein the storage section further includes a plurality of registers wherein the multiple independently determined values of the parameter supplied from the sense amplifier are stored prior to being supplied to the averaging circuitry.

60. The memory of claim 49, wherein the memory comprises a controller section and a storage section, the storage section including the array, read circuitry, sense amplifier and the averaging circuitry.

61. The memory of claim 60, wherein the storage section further includes a plurality of registers wherein the multiple independently determined values of

the parameter supplied from the sense amplifier are stored prior to being supplied to the averaging circuitry.

62. The memory of claim 49, further comprising:

programming circuitry coupled to the array for changing the state of the storage elements contained therein and coupled to the averaging circuitry for receiving the composite value, wherein the composite value is used during the verify phase of a programming process.

63. A non-volatile memory, comprising:

means for simultaneously biasing one or more storage elements of the non-volatile memory according to a set of operating parameters and target criteria;

means for determining the value of a parameter indicative of the state of each of said storage elements a plurality of times with the storage elements biased according to said set of operating parameters and target criteria; and

means for determining the data content of said storage elements by forming for each of said storage elements a composite of said corresponding plurality of values of said parameter.